DISCUSSION OF THE AMENDMENT

Claim 1 has been amended by incorporating the subject matter of Claim 3, except trimethylamine, therein, and by inserting prefixes --(1)-- and --(2)-- for the respective amine components; Claims 2 and 3 have been canceled. Claims 4, 29-31 and 33 have been amended to be consistent with the amendment to Claim 1. Non-elected Claim 27 has been amended to correct a typographical error.

No new matter is believed to have been added by the above amendment. Claims 1, 4, and 29-33 are now active in the application; Claims 5-28 stand withdrawn from consideration.

REMARKS

The active claims are drawn to a catalyst comprising the combination of two amines, *viz.*, (1) at least one trialkyl monoamine selected from the group consisting of dimethylethylamine, dimethylpropylamine, dimethylbutylamine, dimethylpentylamine, dimethylhexylamine, dimethylheptylamine, dimethyloctylamine, dimethylnonylamine, dimethyldecylamine, dimethylundecylamine, dimethyldodecylamine, dimethyltridecylamine, dimethyltetradecylamine, dimethylpentadecylamine and dimethylhexadecylamine, and (2) at least one amine compound selected from the group consisting of triethylenediamine, N,N,N',N'-tetramethyl-1,6-hexanediamine and N,N-dimethylcyclohexylamine. The catalyst is recited in independent Claim 1 as "for producing a rigid polyurethane foam by means of at least one blowing agent selected from the group consisting of 1,1,1,3,3-pentafluoropropane (HFC-245fa), 1,1,1,3,3-pentafluorobutane (HFC-365mfc) and a low boiling point hydrocarbon."

The rejection of Claims 1, 2, 29 and 32 under 35 U.S.C. § 102(b) as anticipated by U.S. 4,910,230 (Tamano et al), is respectfully traversed. All the active claims now contain the limitations of Claim 3, not subject to this rejection. Accordingly, it is respectfully requested that this rejection be withdrawn.

Prior to discussing the rejections under 35 U.S.C. § 103(a), i.e., over U.S. 5,491,174 (Grier et al) and over U.S. 4,742,089 (Naka et al), the Examiner should consider the following.

Applicants have discovered that the above-discussed combination of amines produces a polyurethane foam that is superior to one using either amine component alone as a catalyst when used in conjunction with a blowing agent selected from the group consisting of HFC-245fa, HFC-365mfc, and a low boiling point hydrocarbon.

Two sets of comparative data in the specification evidence this superiority.

In the first set, which demonstrates the significance of using HFC-245fa or HFC-365mfc as the blowing agent, Examples 1-24 are according to the presently-claimed invention, and Comparative Examples 1-29 are not. The only difference between Comparative Examples 1-14 and the Examples is the catalyst used. Comparative Examples 15-26 employ the amine combination of the present invention, but with HCFC-141b as the blowing agent, i.e., a blowing agent other than HFC-245fa, HFC-365mfc, and a low boiling point hydrocarbon.

The data are shown in Tables 2, 4 and 6, at pages 58-59, 62, and 67, respectively. As described at page 68, lines 14-16, in each Example, a rigid urethane foam excellent in flowability, adhesive strength and dimensional stability, was obtained. For Comparative Examples 1-4 and 8-11, which used only amine (1) as the catalyst, large amounts of the catalyst were required, and the foams were inferior in flowability and dimensional stability, as described at page 68, lines 17-23. For Comparative Examples 5-7 and 12-14, which used only amine (2) as the catalyst, the foams were inferior in flowability, adhesive strength and dimensional stability, as described at the paragraph bridging pages 68 and 69. For Comparative Examples 15-26, using the amine combination of the present claims but with a different blowing agent caused little change in flowability, adhesive strength or dimensional stability of the foams.

The second set of comparative data is analogous to the above-discussed first set, but highlights the significance of using a low boiling point hydrocarbon as an applicable blowing agent. See Tables 8, 10 and 12, and the descriptions of Examples 25-48, and Comparative Examples 30-58, in the specification at page 81, lines 1-26.

The comparative data is set forth in greater detail below. In the Tables, as can be confirmed by, for example, Table 1 at page 57 of the specification, Catalyst A is dimethylbutylamine; Catalyst B is dimethylhexylamine; Catalyst C is dimethyloctylamine; Catalyst D is dimethyldodecylamine; Catalyst E is triethylenediamine; Catalyst F is N,N,N',N'-tetramethyl-1,6-hexanediamine; and Catalyst G is N,N-dimethylcyclohexylamine.

When HFC-245fa was used as a blowing agent:

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst A and at least one of Catalysts E to G (Present Inv.)	Examples 1 to 3	81 to 82	1.17 to 1.20	-1.3 to -1.0
Catalyst A alone	Comparative Example 1	76	1.38	-8.8
Catalyst E alone	Comparative Example 5	72	0.45	-3.5
Catalyst F alone	Comparative Example 6	76	0.51	-5.2
Catalyst G alone	Comparative Example 7	76	0.48	-5.6

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst B and at least one of Catalysts E to G (Present Inv.)	Examples 4 to 6	79 to 81	1.32 to 1.45	-1.2 to -0.7
Catalyst B alone	Comparative Example 2	77	1.56	-9.2
Catalyst E alone	Comparative Example 5	72	0.45	-3.5
Catalyst F alone	Comparative Example 6	76	0.51	-5.2
Catalyst G alone	Comparative Example 7	76	0.48	-5.6

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst C and at least one of Catalysts E to G (Present Inv.)	Examples 7 to 9	79 to 83	1.21 to 1.33	-1.2 to -0.8
Catalyst C alone	Comparative Example 3	75	1.5	-8.5
Catalyst E alone	Comparative Example 5	72	0.45	-3.5
Catalyst F alone	Comparative Example 6	76	0.51	-5.2
Catalyst G alone	Comparative Example 7	76	0.48	-5.6

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst D and at least one of Catalysts E to G (Present Inv.)	Examples 10 to 12	79 to 83	1.14 to 1.28	-1.5 to -0.9
Catalyst D alone	Comparative Example 4	76	1.41	-7.7
Catalyst E alone	Comparative Example 5	72	0.45	-3.5
Catalyst F alone	Comparative Example 6	76	0.51	-5.2
Catalyst G alone	Comparative Example 7	76	0.48	-5.6

As is evident from the above tables, where HFC-245fa was used as a blowing agent, when Catalyst A, B, C or D was used alone, the dimensional stability was reduced substantially. Further, when Catalyst E, F or G was used alone, the adhesive strength and dimensional stability were reduced substantially. Accordingly, the adhesive strength and dimensional stability can be improved by the combination of Catalyst A, B, C or D and Catalyst E, F or G in the present invention.

When HFC-365mfc was used as a blowing agent:

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst A and at least one of Catalysts E to G (Present Inv.)	Examples 13 to 15	78 to 80	1.26 to 1.48	-1.2 to -0.9
Catalyst A alone	Comparative Example 8	75	1.62	-8.2
Catalyst E alone	Comparative Example 12	72	0.67	-2.7
Catalyst F alone	Comparative Example 13	75	0.76	-4.3
Catalyst G alone	Comparative Example 14	76	0.72	-4.4

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst B and at least one of Catalysts E to G (Present Inv.)	Examples 16 to 18	78 to 79	1.42 to 1.66	-1.1 to -0.7
Catalyst B alone	Comparative Example 9	75	1.75	-7.5
Catalyst E alone	Comparative Example 12	72	0.67	-2.7
Catalyst F alone	Comparative Example 13	75	0.76	-4.3
Catalyst G alone	Comparative Example 14	76	0.72	-4.4

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst C and at least one of Catalysts E to G (Present Inv.)	Examples 19 to 21	78 to 80	1.30 to 1.52	-1.2 to -0.7
Catalyst C alone	Comparative Example 10	75	1.68	-7.8
Catalyst E alone	Comparative Example 12	72	0.67	-2.7
Catalyst F alone	Comparative Example 13	75	0.76	-4.3
Catalyst G alone	Comparative Example 14	76	0.72	-4.4

Catalyst	Data	Flowability (cm)	Adhesive strength (kgf/cm^2)	Dimensional stability (%)
Combination of Catalyst D and at least one of Catalysts E to G (Present Inv.)	Examples 22 to 24	78 to 81	1.25 to 1.43	-1.4 to -0.8
Catalyst D alone	Comparative Example 11	76	1.55	-7.2
Catalyst E alone	Comparative Example 12	72	0.67	-2.7
Catalyst F alone	Comparative Example 13	75	0.76	-4.3
Catalyst G alone	Comparative Example 14	76	0.72	-4.4

As is evident from the above tables, where HFC-365mfc was used as a blowing agent, when Catalyst A, B, C or D was used alone, the dimensional stability was reduced substantially. Further, when Catalyst E, F or G was used alone, the adhesive strength and dimensional stability were reduced substantially. Accordingly, the adhesive strength and

dimensional stability are improved by the combination of Catalyst A, B, C or D and Catalyst E, F or G in the present invention.

Neither the presently-claimed invention, nor the above-discussed superior results, are disclosed or suggested by the applied prior art.

The rejection of Claims 1-4, 29, 32 and 33 (the rejection of Claims 30 and 31 having been withdrawn in the Advisory Action) under 35 U.S.C. § 103(a) as unpatentable over Grier et al, is respectfully traversed. Grier et al is drawn to novel catalyst compositions comprising complexes of tin (IV) salts and amine compounds for preparing, *inter alia*, polyurethanes. Grier et al further discloses that additional cocatalysts may be used, and list tertiary amines such as the trialkylamines, and triethylenediamine (column 9, lines 47-52). But Grier et al neither discloses nor suggests any members of the formula (1) Markush group. Indeed, each tertiary monoamine disclosed by Grier et al contains three same alkyl groups. Thus, the claims should be allowable for the same reasons the Examiner withdrew the rejection of Claims 30 and 31, i.e., Grier et al does not even list these amines. The above-discussed comparative data is further evidence of patentability.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 1-4 and 29-33 under 35 U.S.C. § 103(a) as unpatentable over Naka et al, is respectfully traversed. Naka et al is drawn to the production of rigid polyurethane foams by reacting a polyol component having a special composition with an isocyanate component in the presence of a blowing agent, a reaction catalyst and a foam stabilizer having particular properties (Abstract). But Naka et al neither discloses nor suggests any members of the formula (1) Markush group. Thus, the claims should be allowable for the same reasons the Examiner withdrew the rejection of Claims 30 and 31 over Grier et al, i.e., Naka et al does not even list these amines. In addition, among the blowing

agents listed in Naka et al (column 4, lines 24-34), none are within the terms of the present claims. The above-discussed comparative data is further evidence of patentability.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

All of the presently active claims in this application are now believed to be in immediate condition for allowance. The Examiner is respectfully requested to rejoin non-elected method claims of equal scope, and in the absence of further grounds of rejection, pass this application to issue with all active and rejoined claims.

Respectfully submitted,

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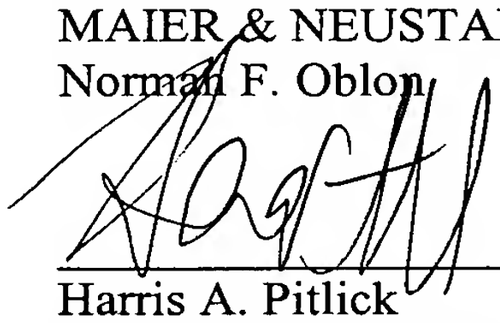

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